

Claims:

1. A 3-5 group compound semiconductor represented by the general formula $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$ ($x+y+z=1$, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$) in which the concentration of an n-type carrier is $1 \times 10^{19} \text{ cm}^{-3}$ or less, wherein the concentration of a p-type dopant is $1 \times 10^{17} \text{ cm}^{-3}$ or more and $1 \times 10^{21} \text{ cm}^{-3}$ or less.

2. A 3-5 group compound semiconductor having a structure in which a second layer composed of a 3-5 group compound semiconductor represented by the general formula $\text{In}_u\text{Ga}_v\text{Al}_w\text{N}$ ($u+v+w=1$, $0 < u \leq 1$, $0 \leq v < 1$, $0 \leq w < 1$) is adjacent to a first layer composed of a 3-5 group compound semiconductor represented by the general formula $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$ ($x+y+z=1$, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$) in which the concentration of an n-type carrier is $1 \times 10^{19} \text{ cm}^{-3}$ or less, wherein the concentration of a p-type dopant is $1 \times 10^{17} \text{ cm}^{-3}$ or more and $1 \times 10^{21} \text{ cm}^{-3}$ or less, and the band gap is larger than that of said second layer.

3. A 3-5 group compound semiconductor having a structure in which a layer composed of a 3-5 group compound semiconductor represented by the general formula $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$ ($x+y+z=1$, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$) in which the concentration of an n-type carrier is $1 \times 10^{19} \text{ cm}^{-3}$ or less, wherein the concentration of a p-type dopant is $1 \times 10^{17} \text{ cm}^{-3}$ or more and $1 \times 10^{21} \text{ cm}^{-3}$ or less is adjacent to a layer composed of a p-type 3-5 group compound

4. A 3-5 group compound semiconductor having a structure comprising at least one layer composed of a 3-5 group compound semiconductor represented by the general formula $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$ ($x+y+z=1$, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$) in which the concentration of an n-type carrier is $1 \times 10^{19} \text{ cm}^{-3}$ or less, wherein the concentration of a p-type dopant is $1 \times 10^{17} \text{ cm}^{-3}$ or more and $1 \times 10^{21} \text{ cm}^{-3}$ or less, between a layer composed of a 3-5 group compound semiconductor represented by the general formula $\text{In}_u\text{Ga}_v\text{Al}_w\text{N}$ ($u+v+w=1$, $0 < u \leq 1$, $0 \leq v < 1$, $0 \leq w < 1$) and a layer composed of a p-type 3-5 group compound semiconductor represented by the general formula $\text{In}_a\text{Ga}_b\text{Al}_c\text{N}$ ($a+b+c=1$, $0 \leq a \leq 1$, $0 \leq b \leq 1$, $0 \leq c \leq 1$).

5. A 3-5 group compound semiconductor having a structure comprising a second layer composed of a 3-5 group compound semiconductor represented by the general formula $\text{In}_u\text{Ga}_v\text{Al}_w\text{N}$ ($u+v+w=1$, $0 < u \leq 1$, $0 \leq v < 1$, $0 \leq w < 1$) carrying thereon a laminated layer composed of an n-type 3-5 group compound semiconductor represented by the general formula $\text{In}_p\text{Ga}_q\text{Al}_r\text{N}$ ($p+q+r=1$, $0 \leq p \leq 1$, $0 \leq q \leq 1$, $0 \leq r \leq 1$) having larger band gap than that of said second layer, and at least one layer composed of a 3-5 group compound semiconductor represented by the general formula $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$ ($x+y+z=1$, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$) in which the concentration of an n-type carrier is $1 \times 10^{19} \text{ cm}^{-3}$ or less, wherein

3-5 group compound semiconductor and a third layer composed of a p-type 3-5 group compound semiconductor represented by the general formula $\text{In}_a\text{Ga}_b\text{Al}_c\text{N}$ ($a+b+c=1$, $0 \leq a \leq 1$, $0 \leq b \leq 1$, $0 \leq c \leq 1$), on the opposite side to said second layer.

6. The 3-5 group compound semiconductor according to any of Claims 1 to 5 wherein the p-type dopant is Mg and/or Zn.

7. A method of producing a 3-5 group compound semiconductor according to any of Claims 1 to 6, comprising growing a 3-5 group compound semiconductor represented by the general formula $\text{In}_x\text{Ga}_y\text{Al}_z\text{N}$ ($x+y+z=1$, $0 \leq x \leq 1$, $0 \leq y \leq 1$, $0 \leq z \leq 1$) in which the concentration of an n-type carrier is $1 \times 10^{19} \text{ cm}^{-3}$ or less, wherein the concentration of a p-type dopant is $1 \times 10^{17} \text{ cm}^{-3}$ or more and $1 \times 10^{21} \text{ cm}^{-3}$ or less, at temperatures of 600°C or more and 950°C or less according to a metal organic vapor phase growth method.

8. A light emitting device obtained by using a 3-5 group compound semiconductor according to any of Claims 1 to 6.